Supplement 1

Estimating the mean and confidence interval from the median and confidence interval

This simplified algorithm is based on the idea that the mean value of a skewed dispersion is located in the center of the confidence interval of the median with displacement towards the median value proportional to the extent of the median value displacement (Figure S1). Thus,

$$m = \frac{M + \frac{(UL - LL)}{2}}{2}$$

where: m: mean; M: median; UL and LL: upper and lower limits of 95% CI of M.

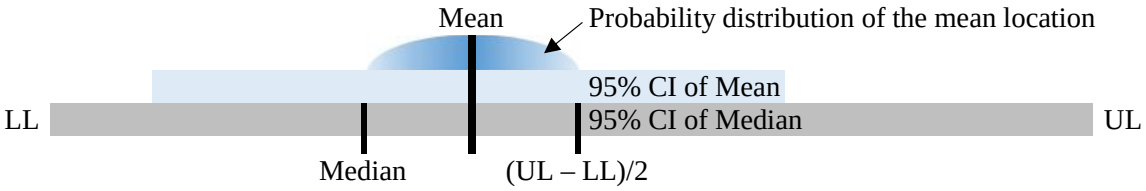

Figure S1. Graphic representation of the idea of the estimation of the mean.

Next, by the modelling on the sample of 10 – 1000 random values (Excel RANDBETWEEN(18;85) function was used to mimic the distribution of adult (18 – 85 years) patients in a clinical trial), it was revealed that 95%CI of the mean value of a sample is virtually always close to 60% of 95%CI (calculated according to Conover[1]) of the corresponding median value (mean of 100 readings, each repeated 10 times, coefficient of variation 1.5-3,2%), independently of the sample size (range 10 – 1000 subjects was tested) (Table S1).

Table S1. Results of modelling of 95% CI of mean to 95% CI of median ratio on different sample sizes (10-1000 subjects), mean value of n=100 readings of the ratio in each attempt.

	Sample size						Weighted
Attempt	10	25	50	100	1000	Average	Average
1	57,0%	61,8%	69,8%	57,9%	60,4%		
2	57,0%	63,0%	64,6%	61,1%	58,4%		
3	58,0%	60,5%	65,3%	63,4%	61,6%		
4	55,8%	61,7%	65,6%	61,5%	57,7%		

Attempt	Sample size					Average	Weighted Average
	10	25	50	100	1000		
5	55,8%	61,5%	68,8%	62,8%	62,2%		
6	57,3%	59,4%	66,1%	60,2%	59,1%		
7	56,8%	60,9%	66,8%	63,6%	60,1%		
8	57,3%	63,8%	63,6%	62,8%	60,9%		
9	55,2%	63,3%	67,2%	62,2%	59,9%		
10	57,0%	61,7%	69,7%	60,9%	61,6%		
Mean	56,7%	61,8%	66,8%	61,6%	60,2%	61,4%	60,6%
SD	0,9%	1,3%	2,1%	1,7%	1,5%		
CV	1,5%	2,2%	3,2%	2,8%	2,4%		

Thus,

$$95\%CI = m \pm \frac{0{,}6\times(UL - LL)}{2}$$

where: m: mean; UL and LL: upper and lower limits of 95% CI of the median.

Checking of the algorithm on some sets of real data confirms its applicability. E.g., estimation of mean of temozolomide (TMZ) prices per mg from the median of 1.77 (95%CI: 1.24 – 2.11) returns mean of 1.72 (95%CI: 1.46 – 1.98) versus the actual mean of 1.7 (95%CI: 1.44 – 1.95), the error is 1.32-1.72%.

$$m = \frac{1{,}77 + \frac{2{,}11 - 1{,}24}{2}}{2} = 1{,}7225$$

$$95\%CI = 1{,}72 \pm \frac{0{,}6\times(2{,}11 - 1{,}24)}{2} = [1{,}459 - 1{,}981]$$

Since we looked for simple and practical algorithm of translation, we consider such precision adequate both for clinical and economic evaluations.

[1] Conover WJ. Practical nonparametric statistics. 3rd ed. New York: Wiley; 1980: 592 p. ISBN 978-0-471-16068-7.